

In Situ Oxygen Generation from CO₂ under Benign Conditions

Completed Technology Project (2017 - 2019)



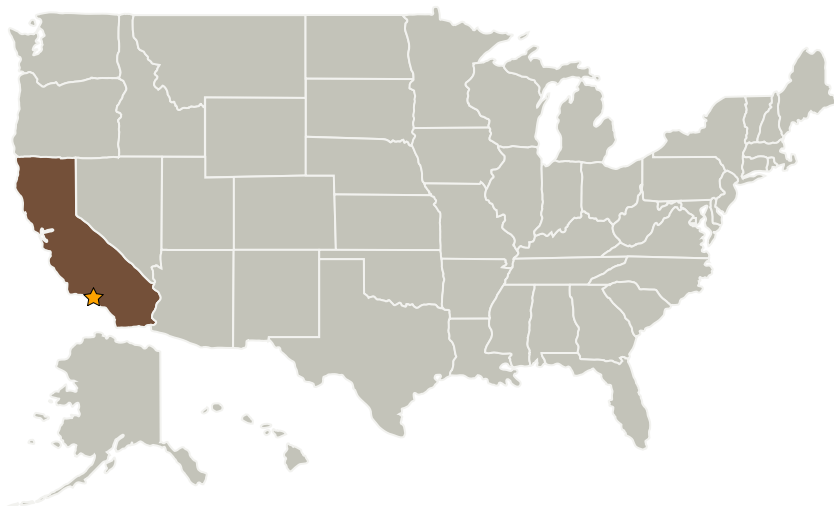
Project Introduction

Pursue molecular- and nano-based catalysts to attach and activate CO₂ molecules to release dioxygen (O₂) after the application of external energy. Our approach seeks to prove that molecular catalysis with electrochemistry is more efficient than high temperature to generate O₂.

Anticipated Benefits

Generating O₂ from CO₂ under benign conditions could provide next generation technology for in situ resource utilization in potential manned missions on Mars, ISS, and other planetary environments. The system in this work could potentially be leveraged to produce fuels, fertilizers, or other species for ISRU applications. The CO₂ conversion to O₂ technology could provide an effective approach to recycle CO₂ from the terrestrial atmosphere and offers great promise for climate control. The system shows promise and is currently at TRL 2.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
California Institute of Technology(CalTech)	Supporting Organization	Academia	Pasadena, California

Primary U.S. Work Locations

California

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Michael R Lapointe

Program Manager:

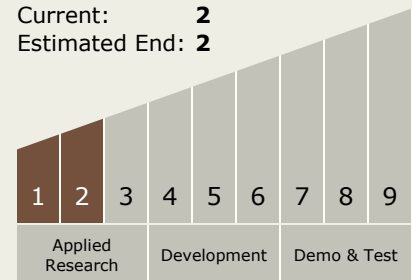
Fred Y Hadaegh

Principal Investigator:

Chaoyin Zhou

Technology Maturity (TRL)

Start: **1**
 Current: **2**
 Estimated End: **2**



Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - TX07.1 In-Situ Resource Utilization
 - TX07.1.3 Resource Processing for Production of Mission Consumables

Target Destinations

Earth, The Moon, Mars